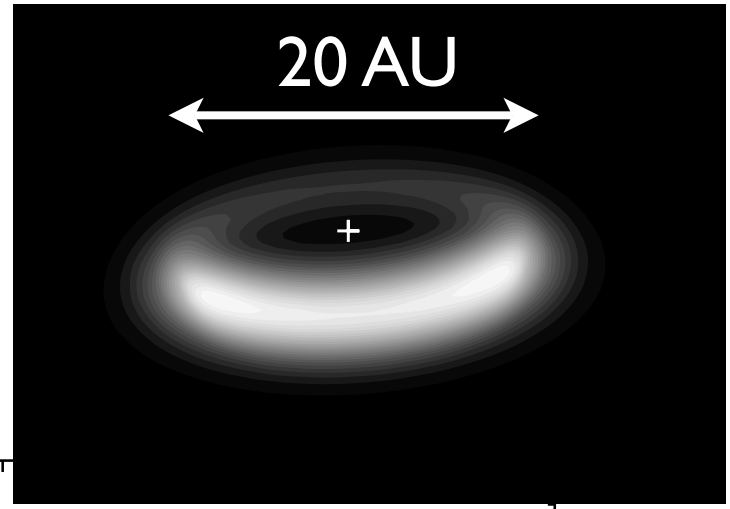
Planet forming disks around dying stars ?

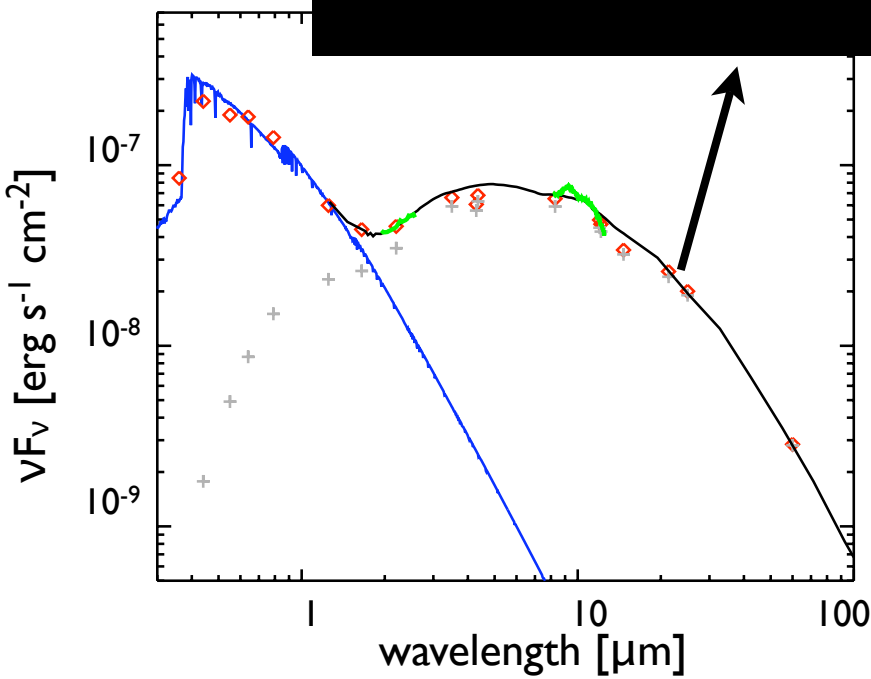
Post-AGB binaries are surrounded by stable disks

- with similar structure as YSO disks
- show very strong dust processing
- even formation of macrostructures



These objects provide insight in

- grain processing
  - ✓ early stages (t ~ 1000 year)
  - ✓ different physical conditions than in YSOs
- key answers in the shapes and shaping of PNe



AC Her

N-band interferometry

- gap in the disk (~10 - 30 AU)

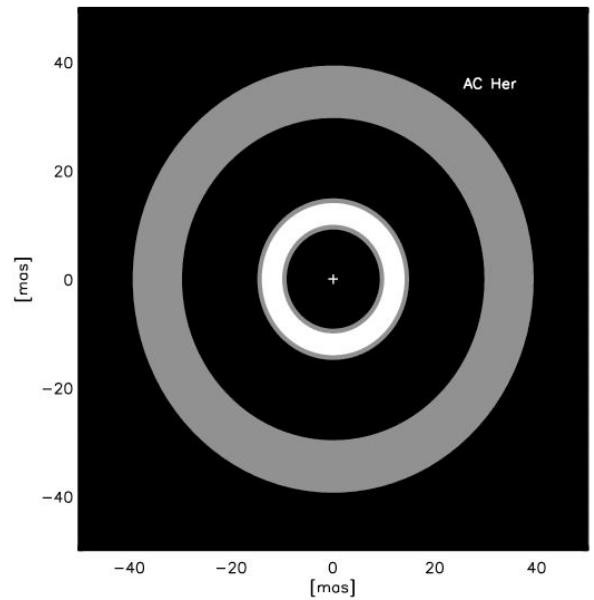
Mineralogy

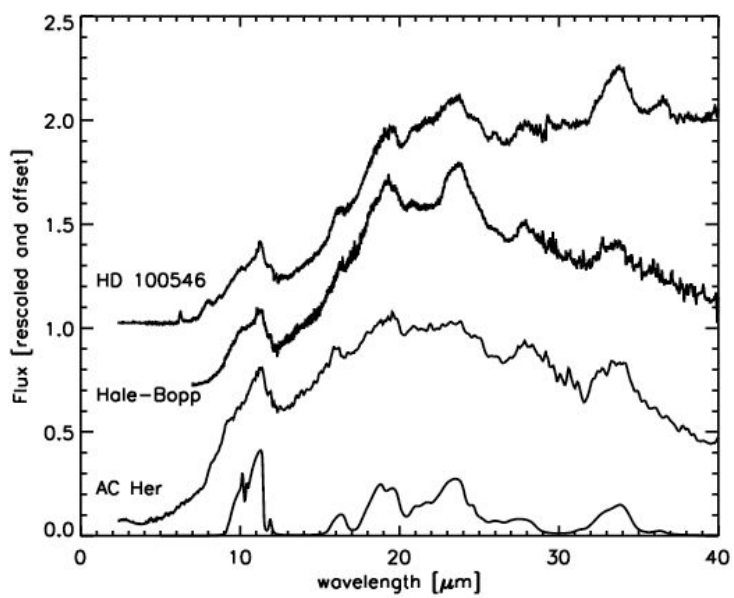
- only 2 dust temperatures
  (Gielen et al., 2007)

Similar spectrum as

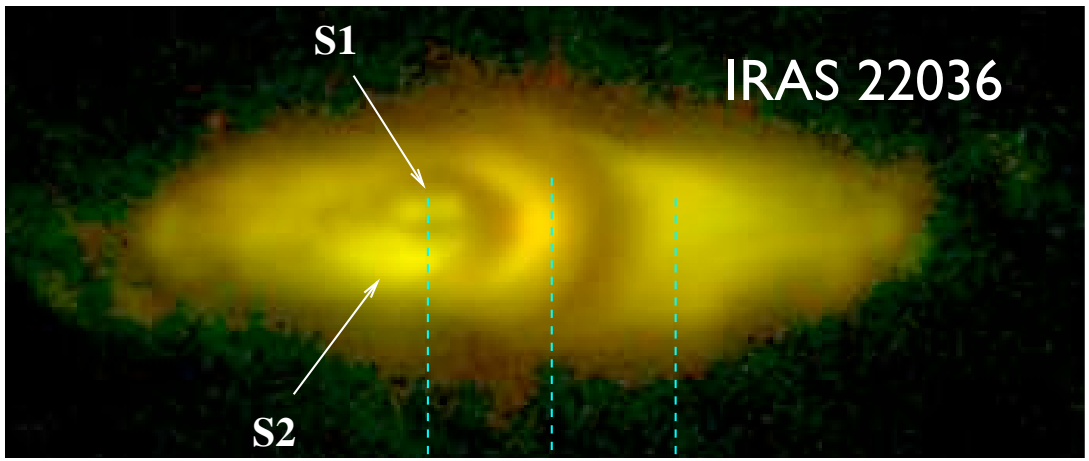
- Hale-Bopp
- HD 100546

Planet clearing a gap ?

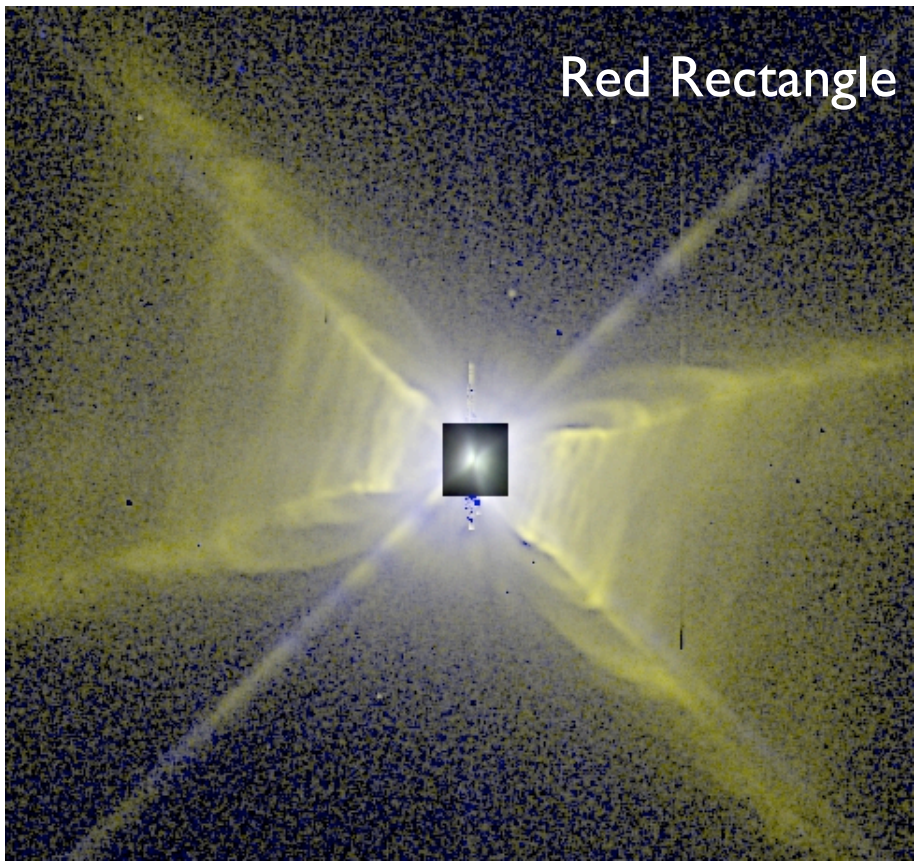




POST-AGB STARS



sahai et al., 2006

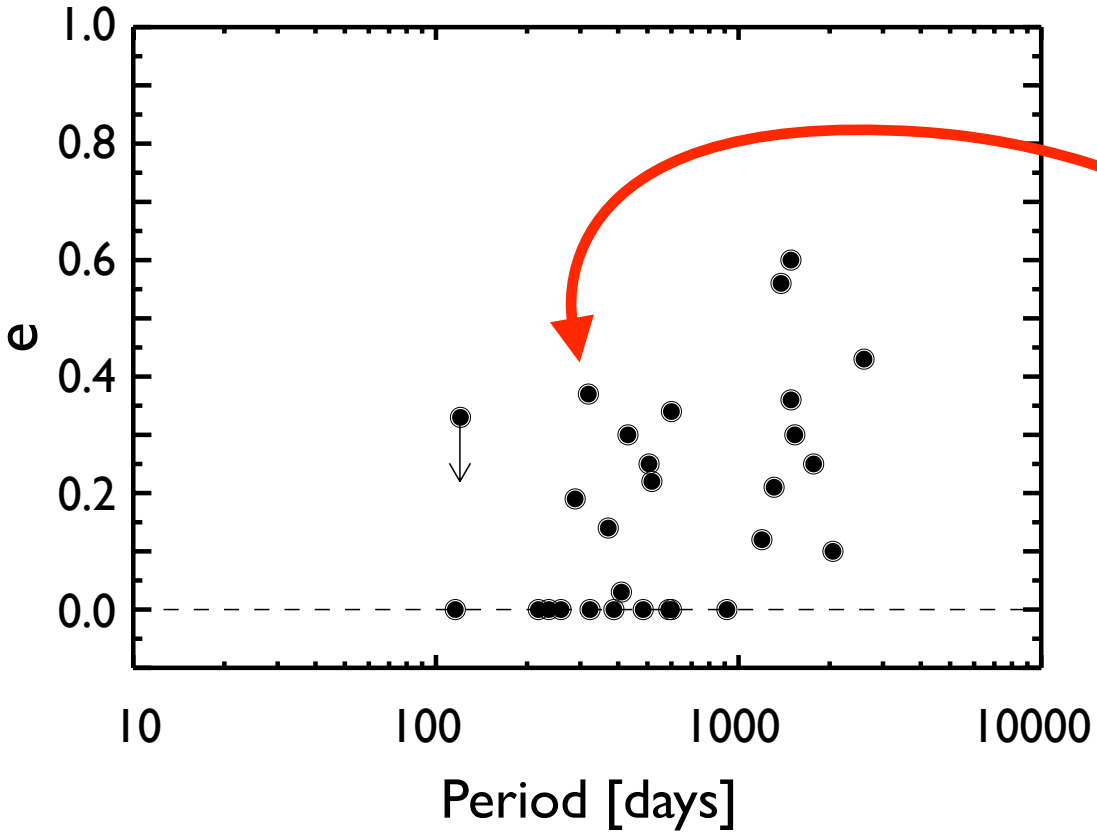


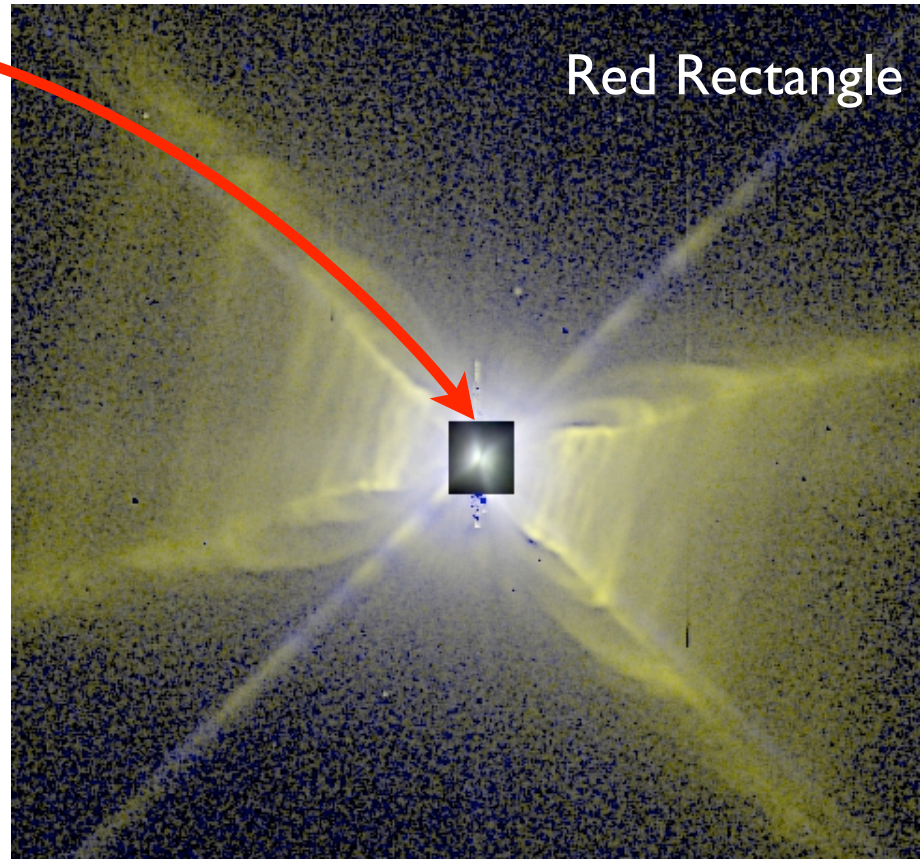
cohen et al. 2005

Post-AGB stars: either

- compact disc
  no strong outflow
- extended torus
  strong outflow

BINARY POST-AGBs

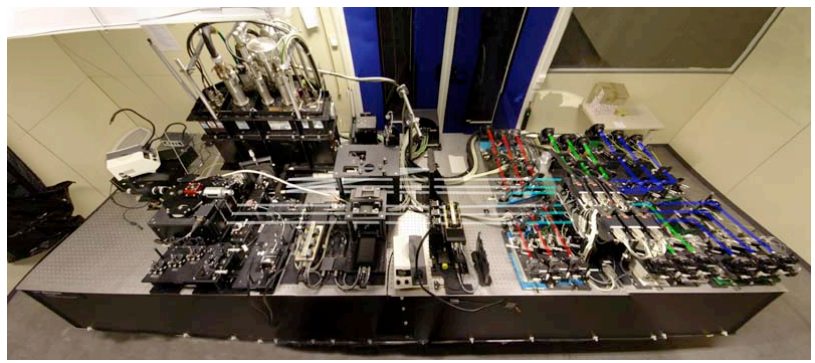


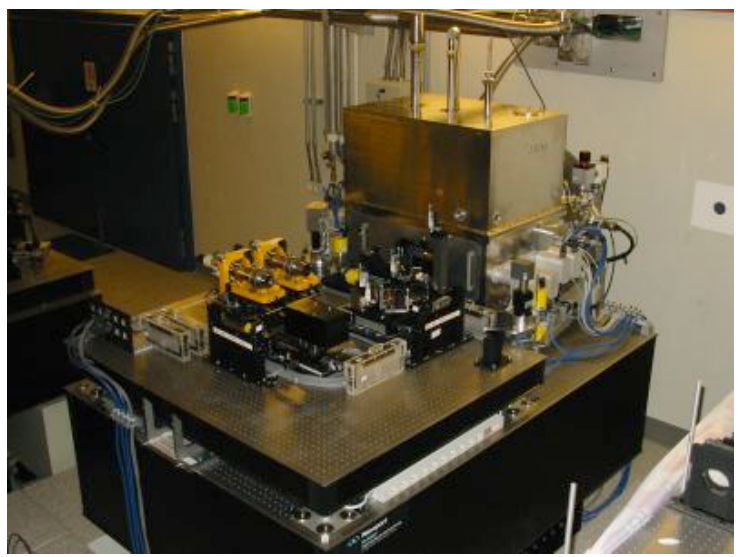


Defining characteristic: broad IR excess starting at the dust sublimation temperature (K-band)

The structure of the CSE:

distances: few kpc
dust starts at few AU
} mas scale ⇒ interferometry

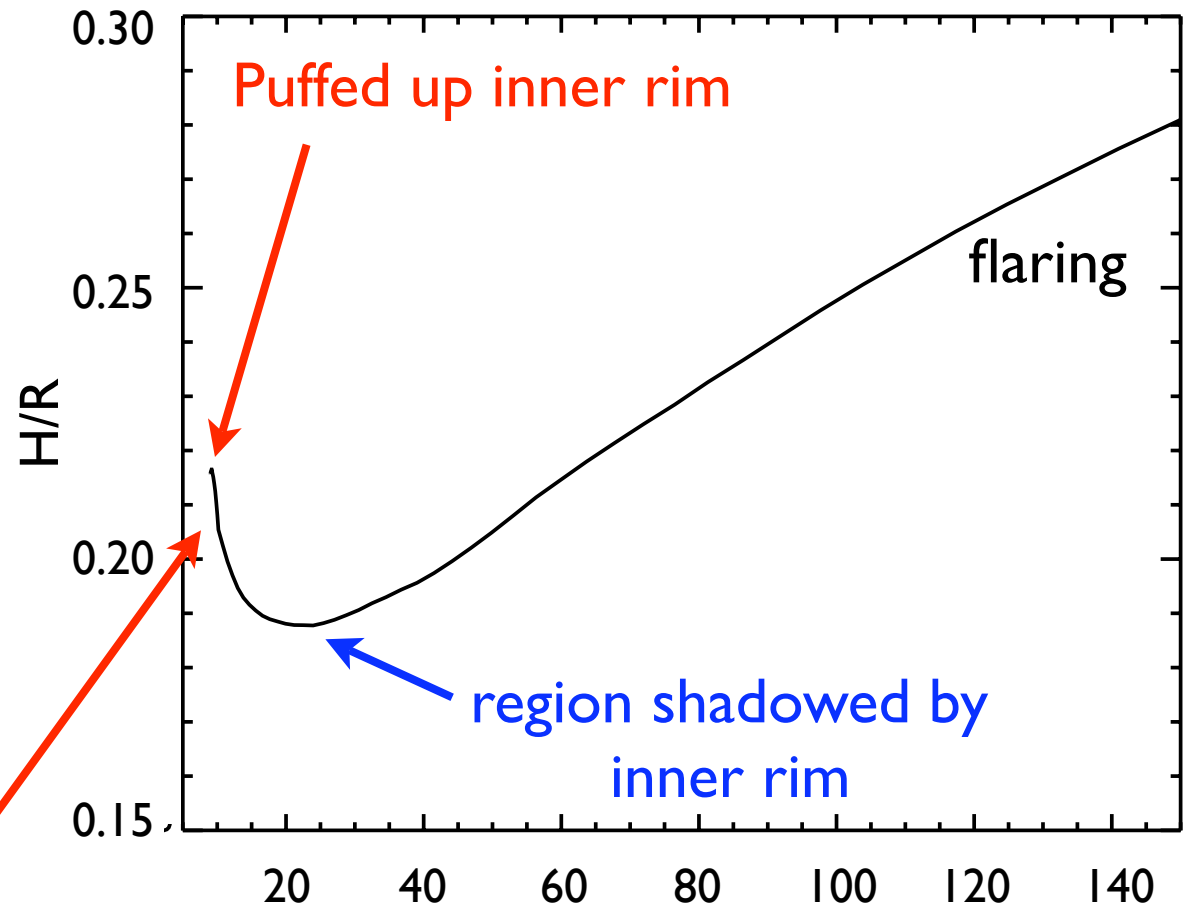




SELF-CONSISTENT 2D - MODEL:

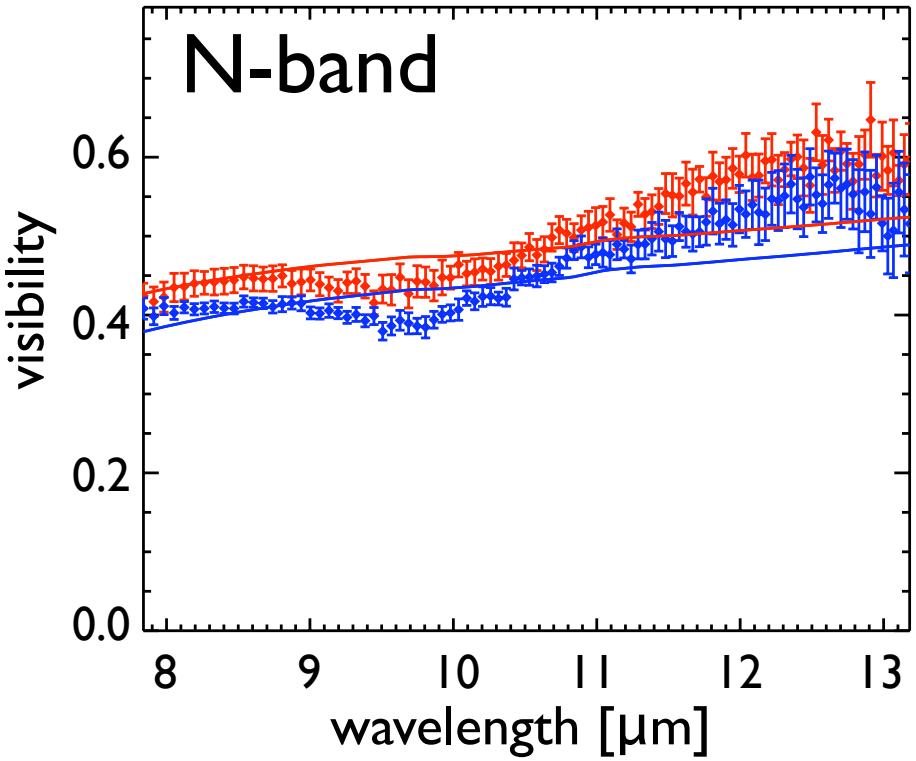
passive **disc** radiative transfer model: Dullemond et al., 2002; 2004

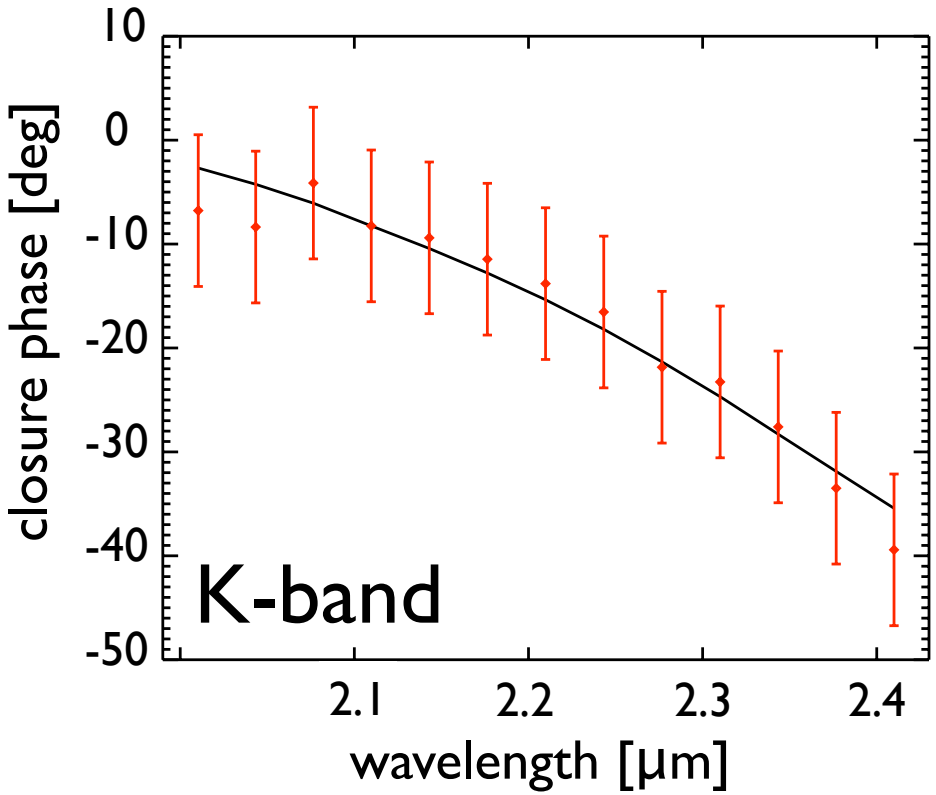
- mixture of gas and dust
- dust irradiated by central star
- structure:
  hydrostatic equilibrium
- dimensions:
  SED constrained
  - ➡ large and processed grains
  - ➡ R_{in} ~ 10 AU
  - ➡ H/R_{in} ~ 0.2

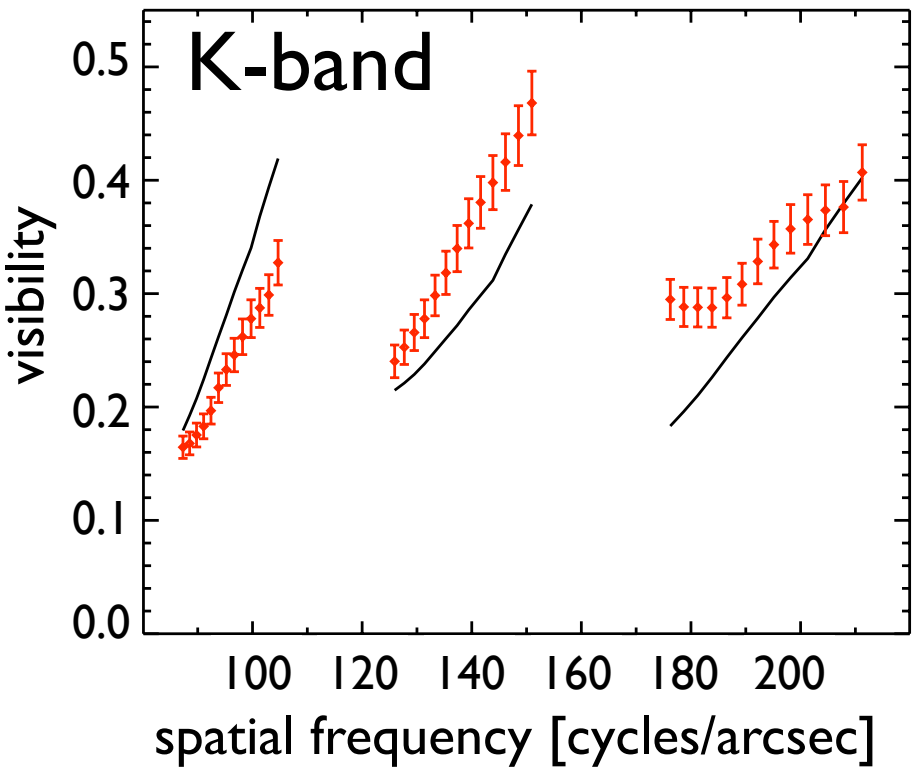


dust at sublimation temperature

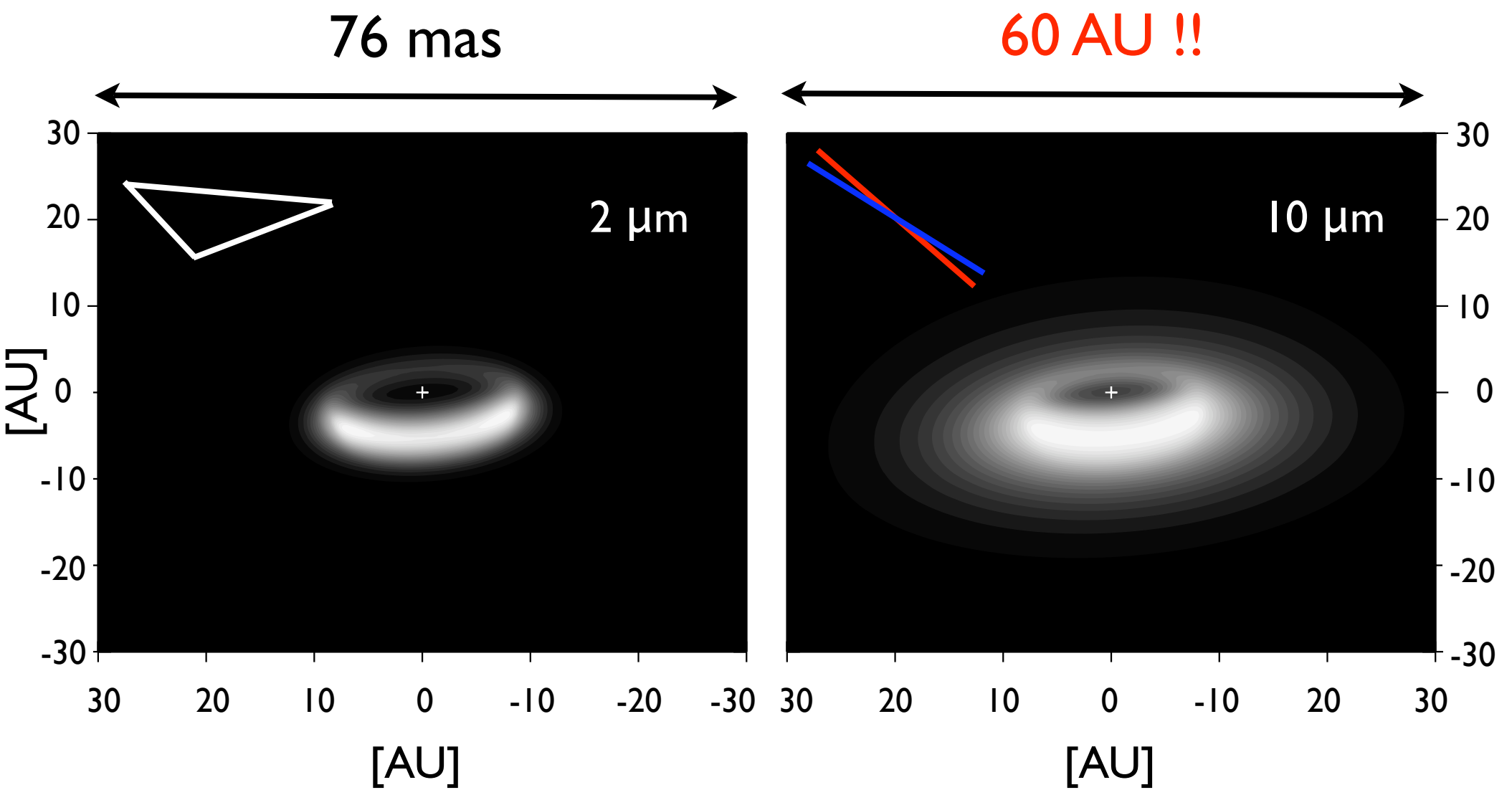
- ✓ Fits the SED
- ✓ Fits the spatially resolved temperature structure from K to N.
- ✓ Fits the angular scales
- ✓ Fits the measured asymmetry
- ✓ is self-consistent







FINAL MODEL: IRAS 08544

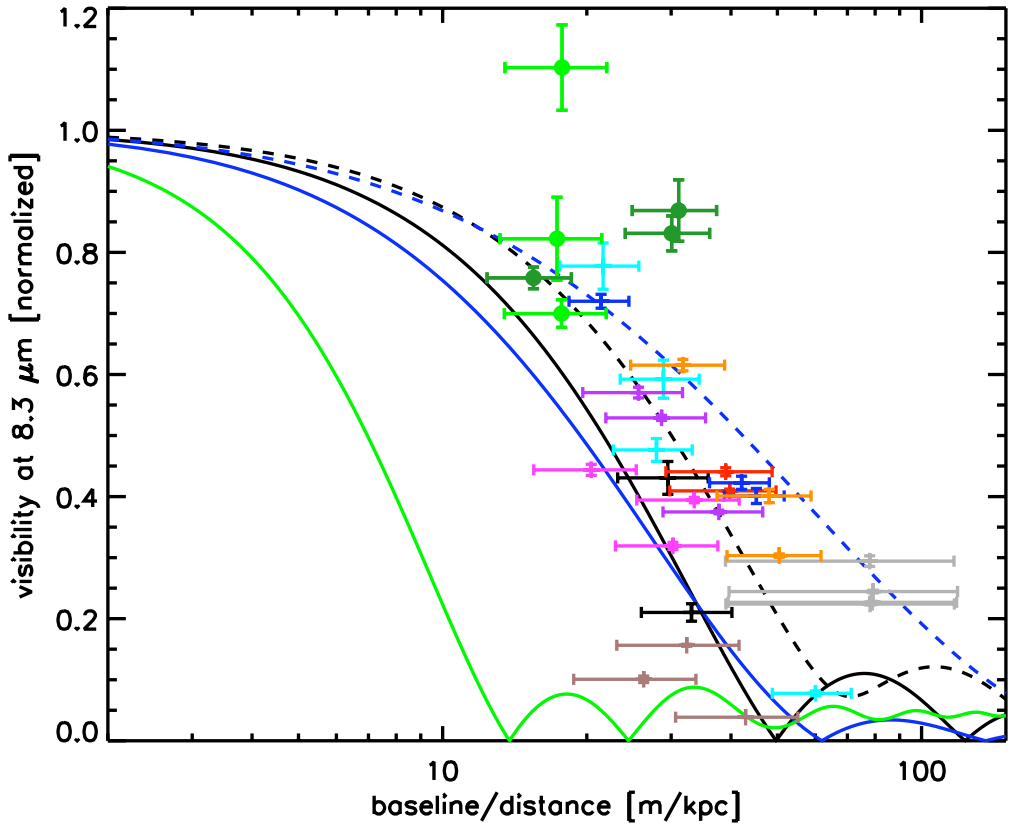


ESO press release 43/07

N-BAND SURVEY

The sample: 11 post-AGB binaries

- binarity:
  - ✓ P_{bin} = 300 - 1400 d
  - ✓ a sin(i) = 0.08 - 1.55 AU
- strong IR-excess
  - ✓ Lir/L* = 10 - 70 %,
  - ✓ E[B-V] = 0.0 - 1.3
- distance
  - ✓ d = 0.6 - 3.4 kpc
- diameter N-band emission
  - ✓ 20 - 60 AU



extremely compact emission
understood as passively irradiated discs